

Energy Situation in Ag

Current Economic Issues in Crop Production

Terry L. Kastens
Kevin C. Dhuyvetter
Department of Agricultural Economics
Kansas State University

See report to the Kansas Energy council entitled:
“Energy Use in the Kansas Agricultural Sector”
by Kastens, Dhuyvetter, Mintert, Nelson, and Li
www.agmanager.info

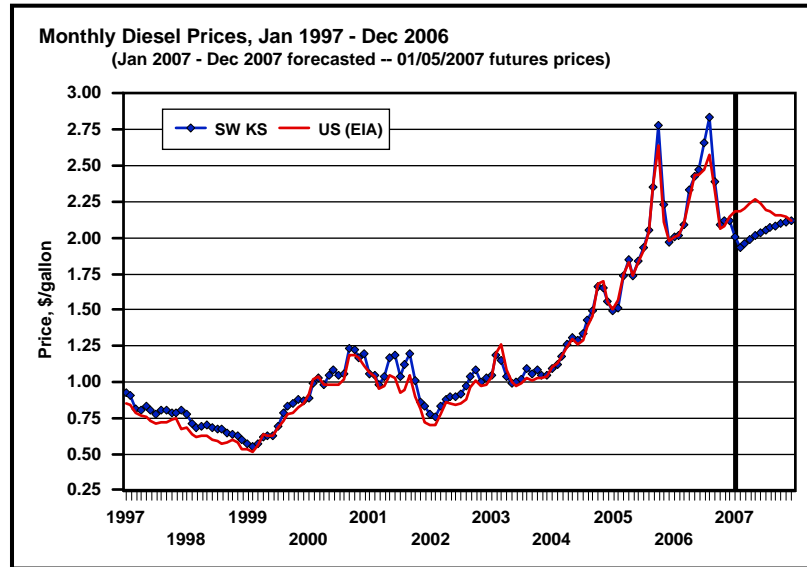


2007 KARA/KSU Crop Production Update
Salina, Kansas, January 17-18, 2007



Outlook

Diesel prices are forecasted to be below 2006 level, but still at historically high levels ...



3

Historical and forecasted diesel prices during principal farming months...

Off-road Diesel Fuel Prices

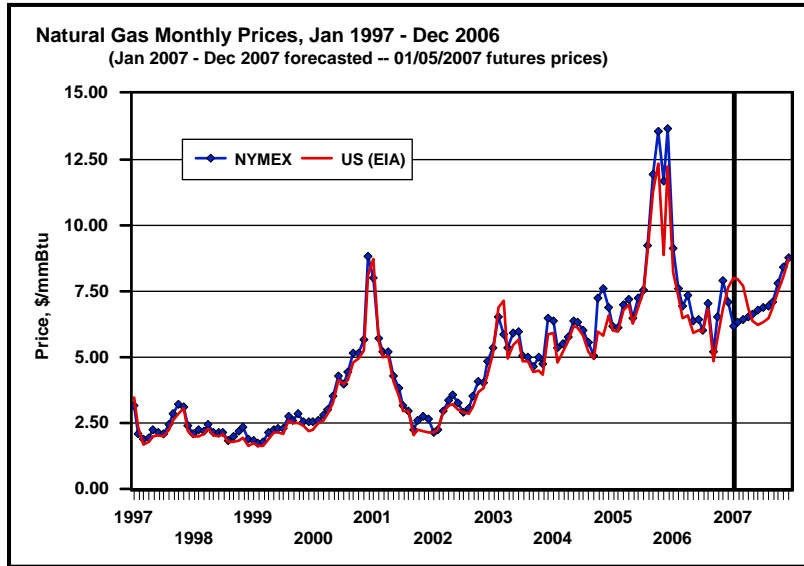
Year	Mar-Oct Diesel Price			Year-to-year percent change		
	SW KS	US (EIA)	Average	SW KS	US (EIA)	Average
2000	\$1.09	\$1.05	\$1.07	-----	-----	-----
2001	\$1.09	\$0.98	\$1.04	0.6%	-6.5%	-2.9%
2002	\$0.94	\$0.88	\$0.91	-14.1%	-10.1%	-12.2%
2003	\$1.05	\$1.05	\$1.05	12.1%	19.1%	15.5%
2004	\$1.37	\$1.35	\$1.36	30.0%	28.9%	29.5%
2005	\$2.04	\$2.01	\$2.02	48.5%	49.2%	48.9%
2006	\$2.41	\$2.34	\$2.37	18.6%	16.0%	17.3%
2007 (F)	\$2.04	\$2.21	\$2.12	-15.4%	-5.6%	-10.6%
2007 - 2006	(\$0.37)	(\$0.13)	(\$0.25)	-15.4%	-5.6%	-10.6%
07 - Avg(00-04)	\$0.93	\$1.15	\$1.04	83.9%	108.2%	95.8%

F = forecast

Based on 1/5/07 futures closing prices

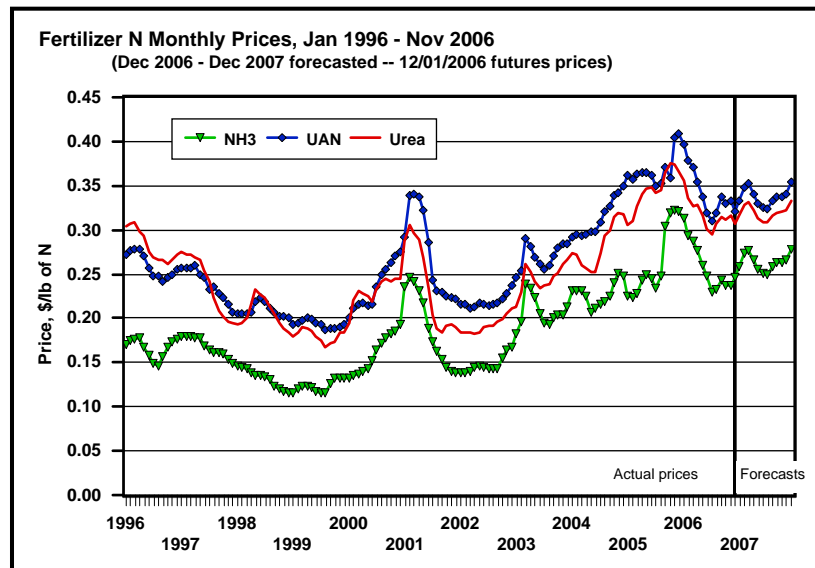
4

Historical and forecasted natural gas prices



8

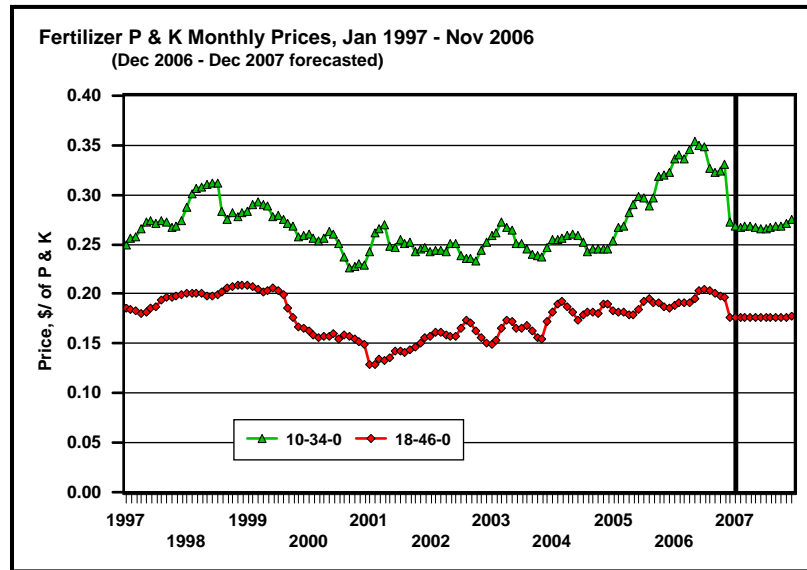
Historical and forecasted nitrogen prices, Corn Belt



... unfortunately, forecasts suggest price will still be high by historical standards in '07.

11

Historical and forecasted phosphate prices



12

**Running out of oil and U.S.
energy independency**

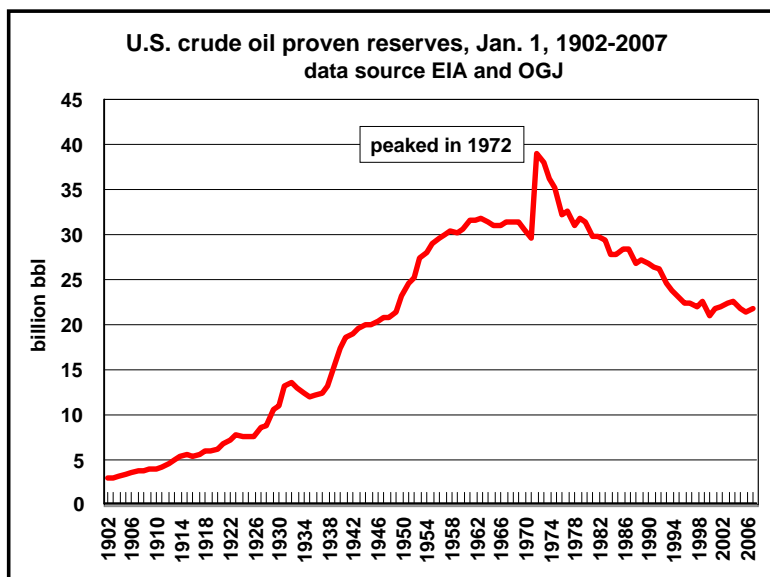
13

Scarce Energy?

- 1859: Drake discovers oil in Pennsylvania
- 1879: USGS formed to deal with running out of oil
- 1882: 95M bbl remain (Institute of Mining Engineers)
- 1918: 3 million cars on the road
- 1919: auto industry shouldn't ignore that only 20 years left (Scientific American)
- 1926: 4.5B bbl left in U.S. (Federal Oil Conservation Board)
- 1930: 18 million cars
- 1932: 10B bbl left in U.S. (Federal Oil Conservation Board)
- 1944: 20B bbl left in U.S. (Petroleum Administrator for War)
- 1950: 100B bbl left in world (American Pet. Institute)
- 1980: proven oil reserves 648B bbl
- 1993: proven oil reserves 999B bbl
- 2000: proven oil reserves 1016B bbl
- 2007: proven oil reserves 1317B bbl

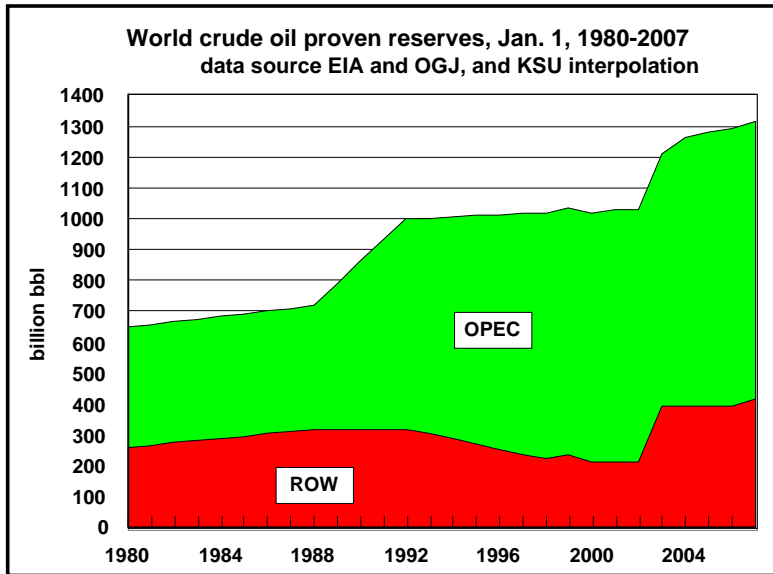
Scarcity is an economic issue, not a physical one

14



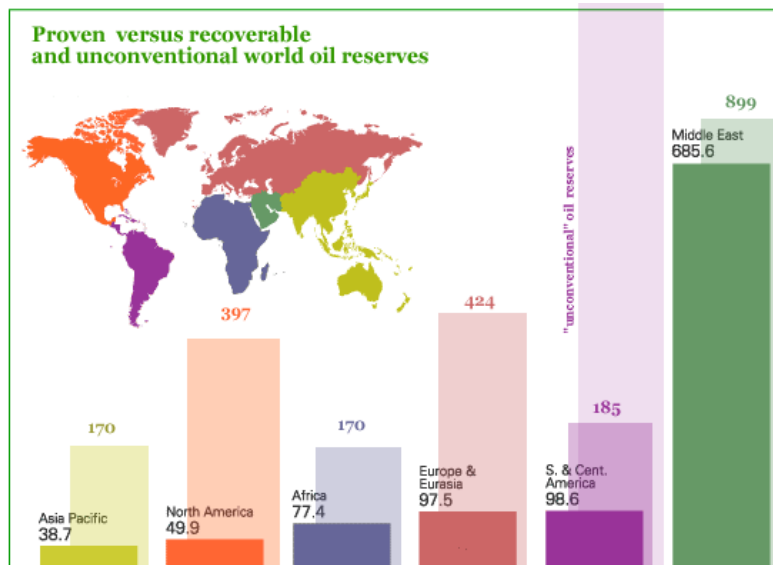
U.S. proven reserves are falling

15



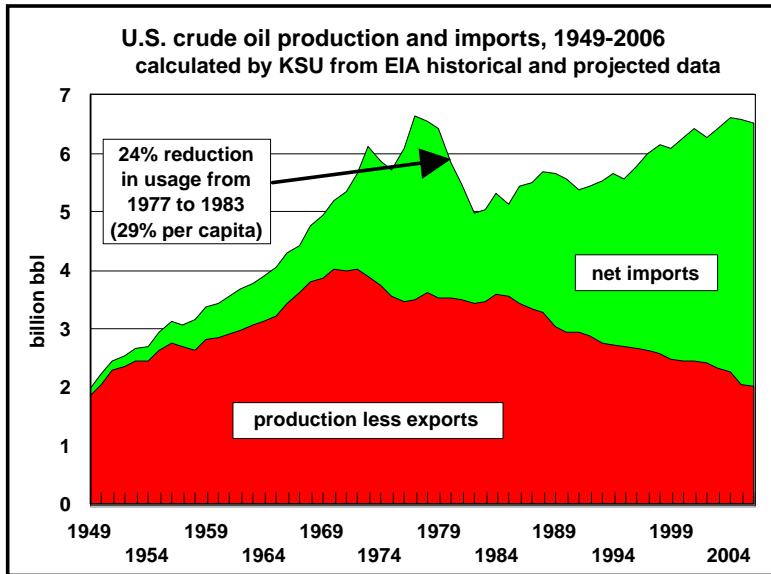
More dependency on OPEC, so also is a political issue

16

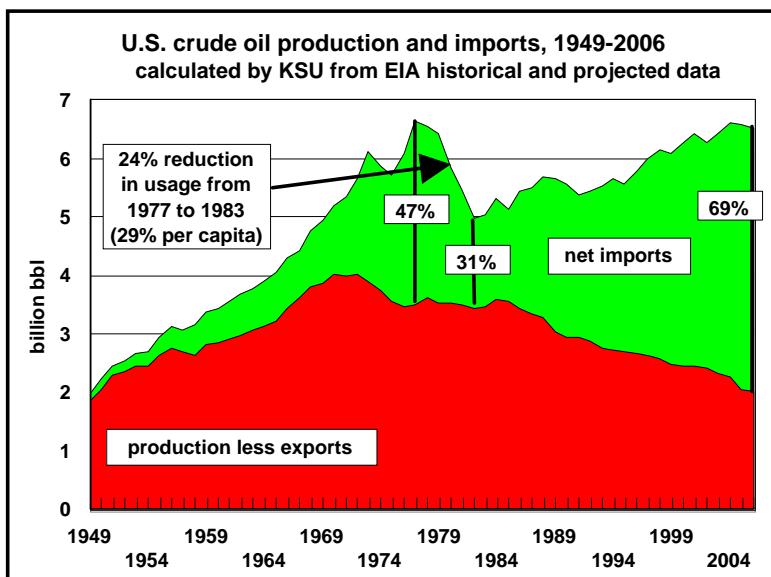


We can find a lot of oil in the western hemisphere if prices stay high

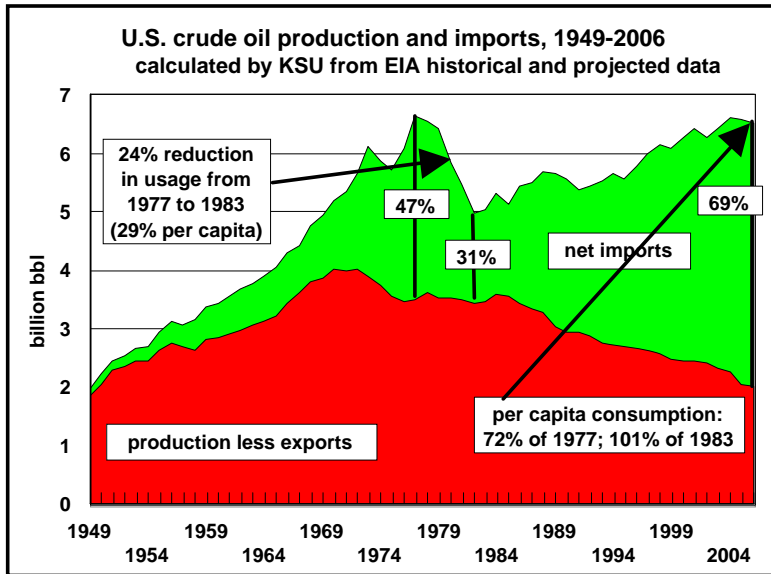
17



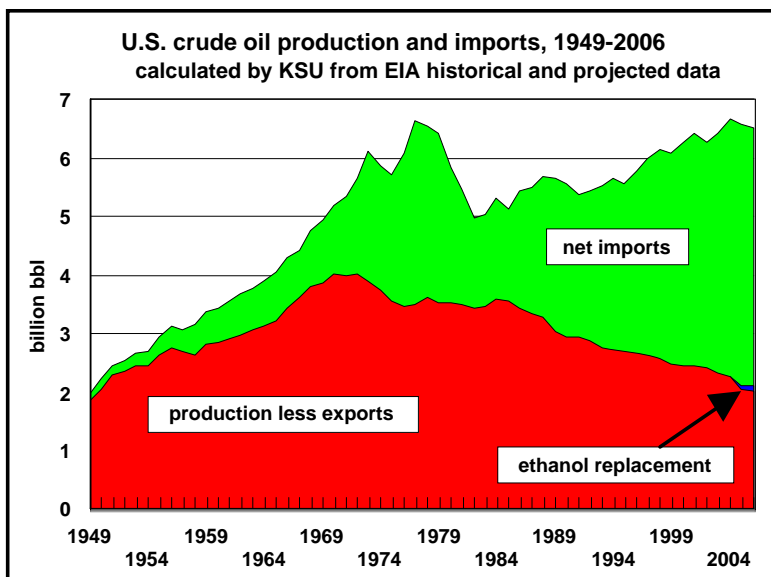
22



23

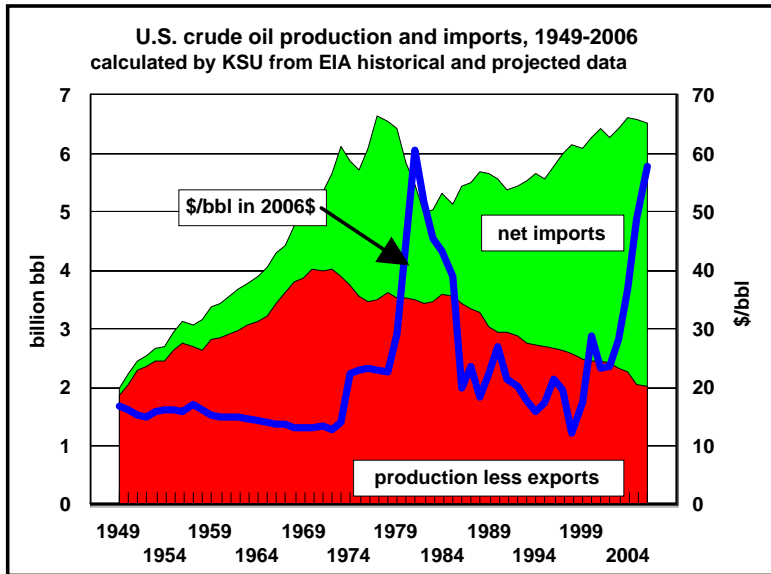


24

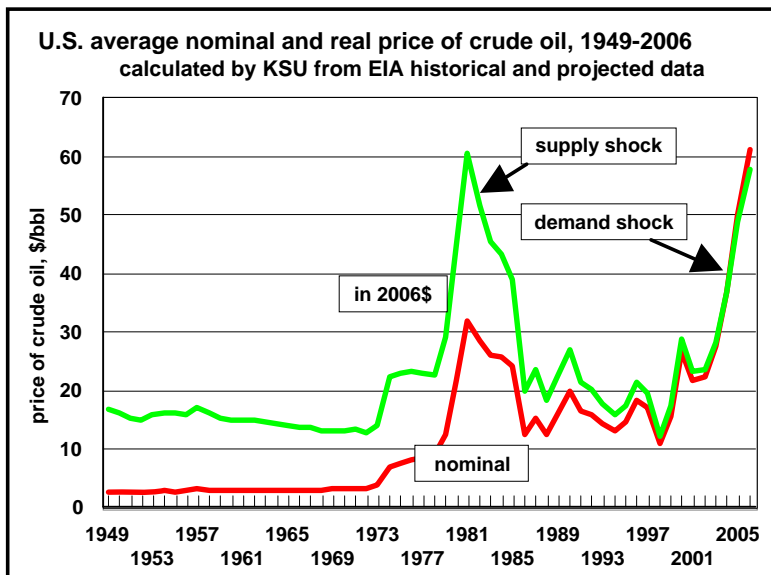


Is crude oil self-sufficiency a reasonable goal? Substitutes for crude? 7.5B gal ethanol might replace 0.098B bbl crude (2.18% of 2006 imports)

25

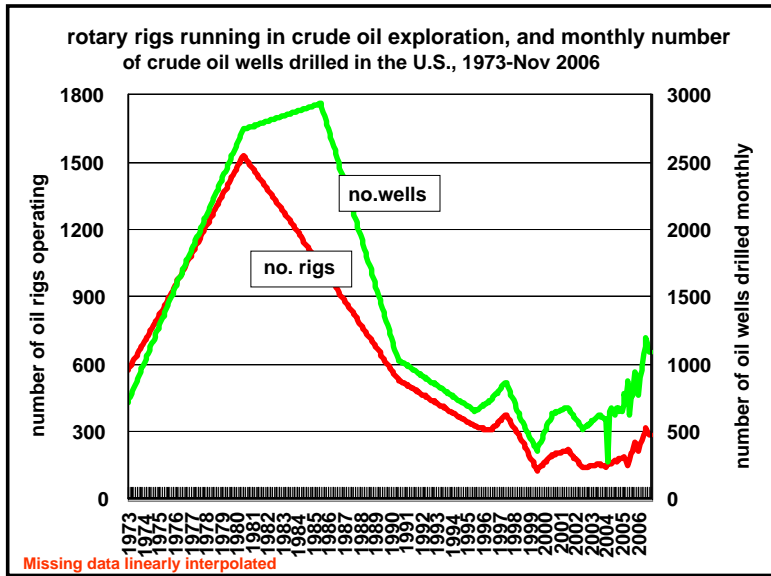


26

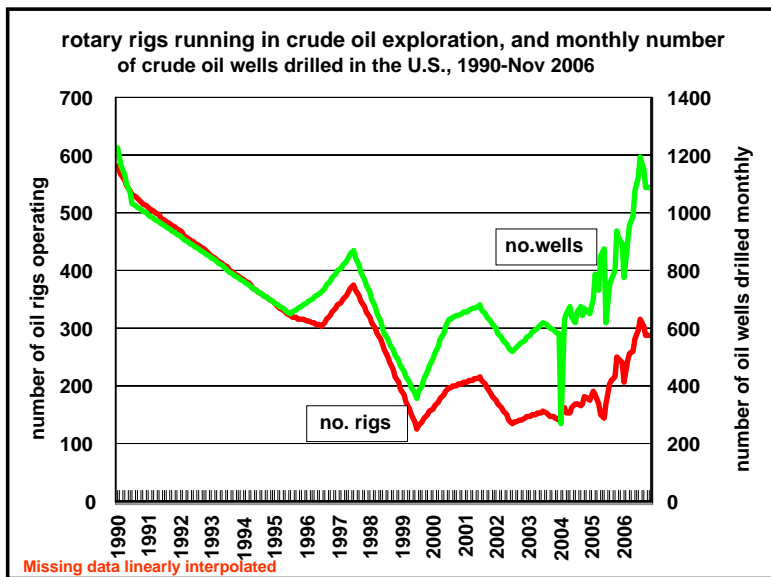


Markets will still work; but will prices fall as fast this time?

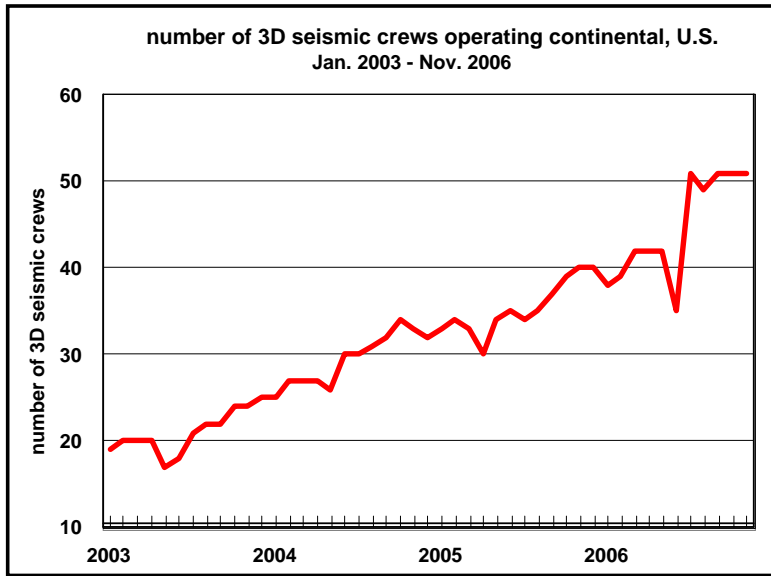
27



Price decimated the U.S. oil industry in the late 1980s and 1990s



Markets will work again and supply will increase as demand is tempered



The petroleum industry is NOT sitting idly by!

30

Renewable Energy

48

Major Renewable Energy Opportunities for Kansas Agriculture

- Ethanol from Commodity Crops
 - corn
 - sorghum
- Biodiesel
 - soybeans
 - animal fats
 - other feedstocks (annual and perennial oils)
- Bioethanol
 - herbaceous energy crops (switchgrass)
 - corn and other crop stovers
- Anaerobic Digestion of Livestock Manures
 - dairy operations only

Source: Richard Nelson, Biological and Agricultural Engineering, KSU

49

Drivers of the Biofuels Industry

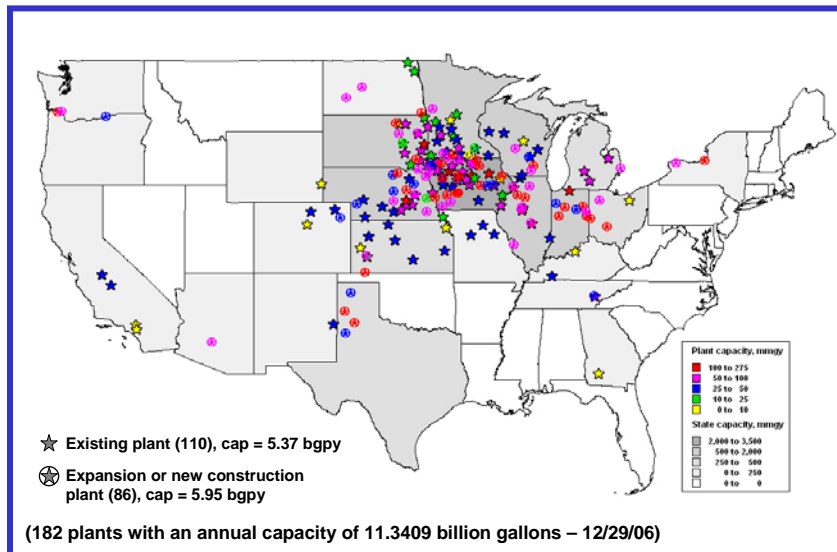
- Ethanol
 - States ban MTBE
 - States mandate ethanol inclusion
 - Subsidies
 - High energy prices
- Bio-diesel
 - Low sulfur requirements for diesel
 - Subsidies
 - High energy prices

50



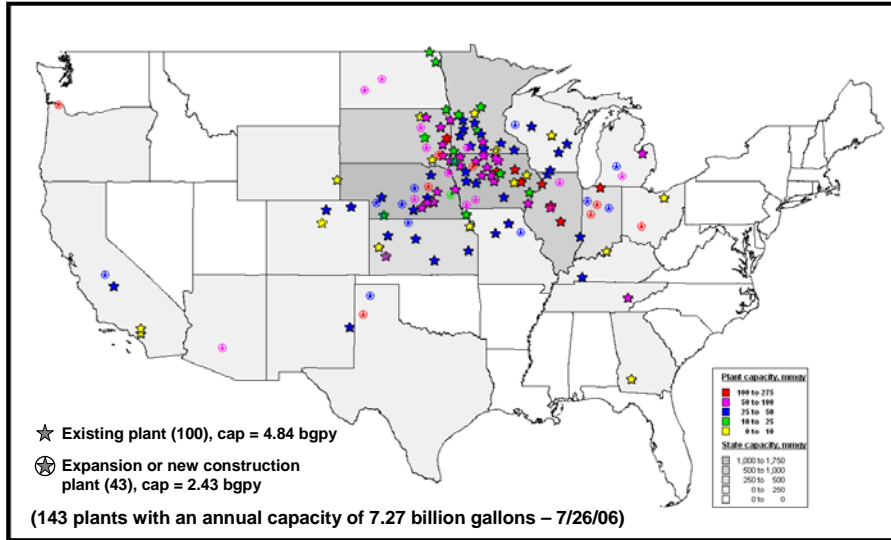
Existing and new ethanol plants

Source: Renewable Fuels Association (RFA), Kansas State University

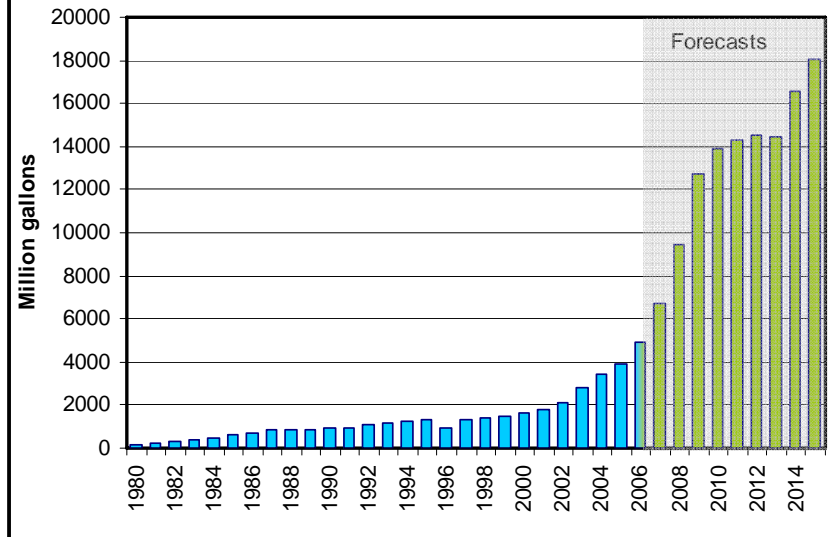


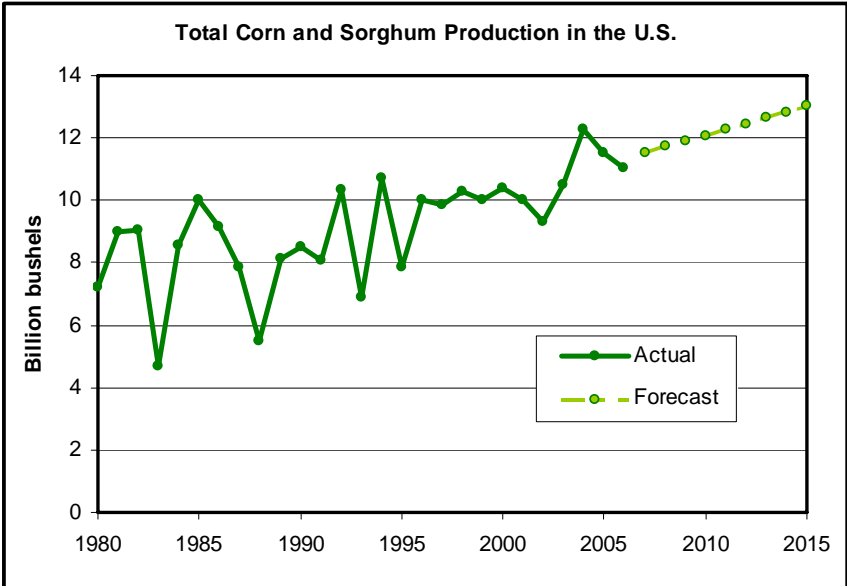
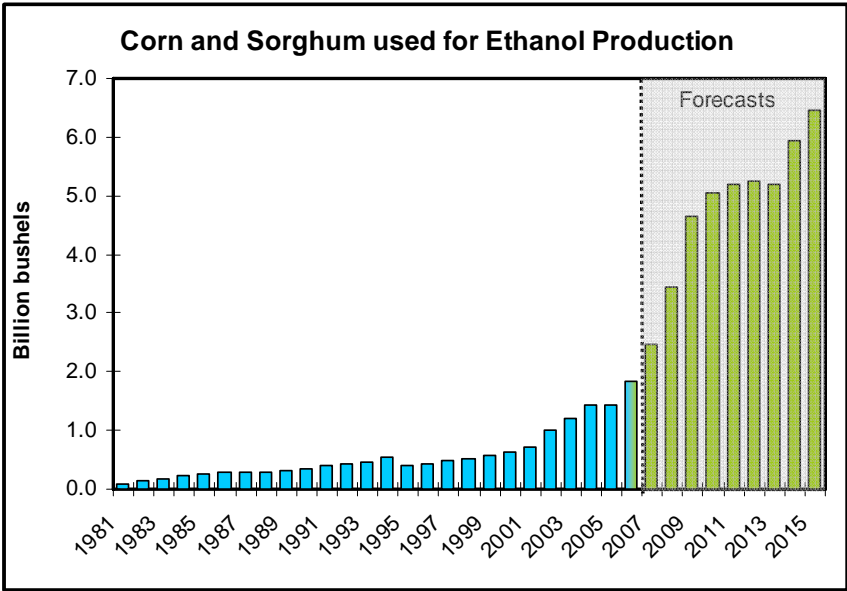
Existing and new ethanol plants

Source: Renewable Fuels Association (RFA), Kansas State University

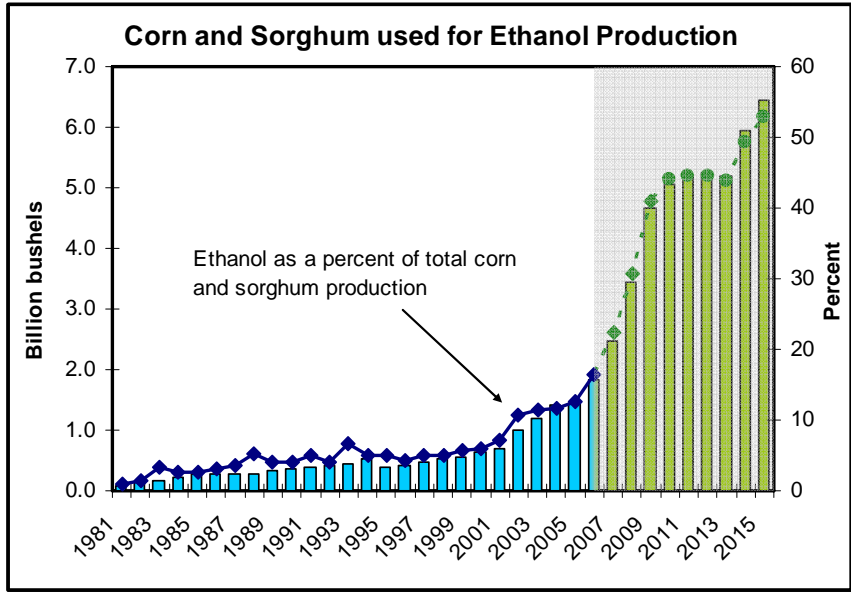


Total Ethanol Production

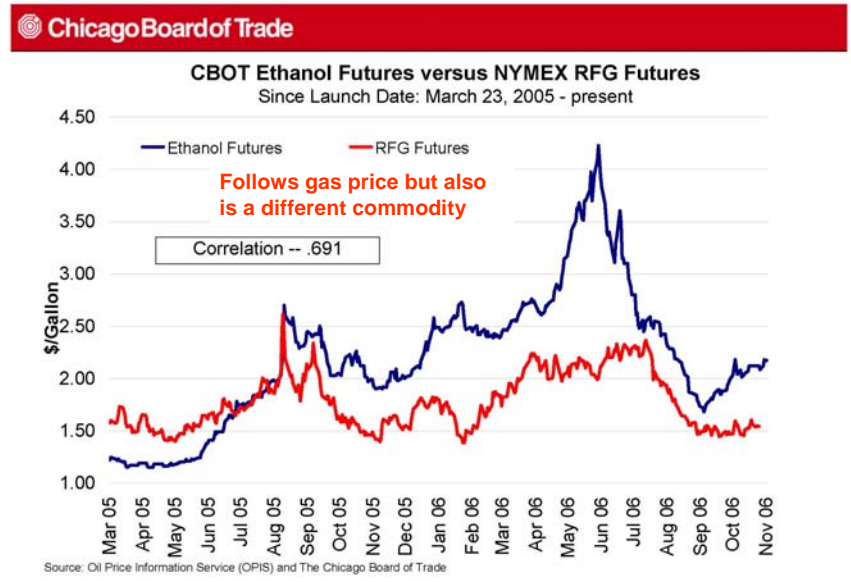




Linear trend is based on data from 1990-2006 only (no adjustment for acres)



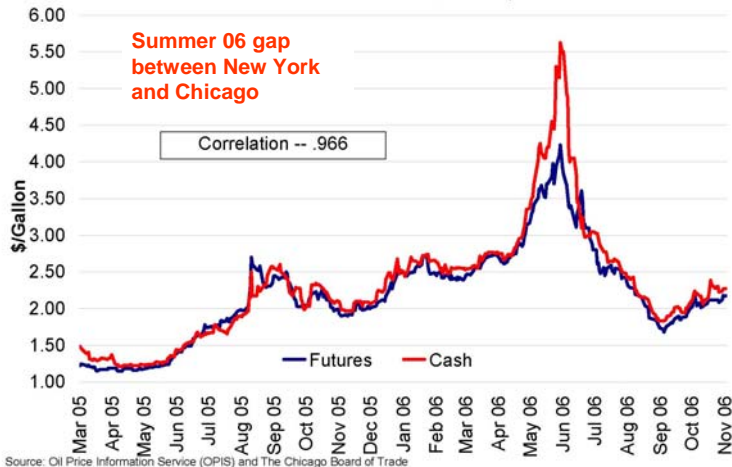
Fairly obvious why we will need considerably more corn acres



RFG (reformulated gasoline, nearly all contains ethanol, about 1/3 of total gasoline sold)

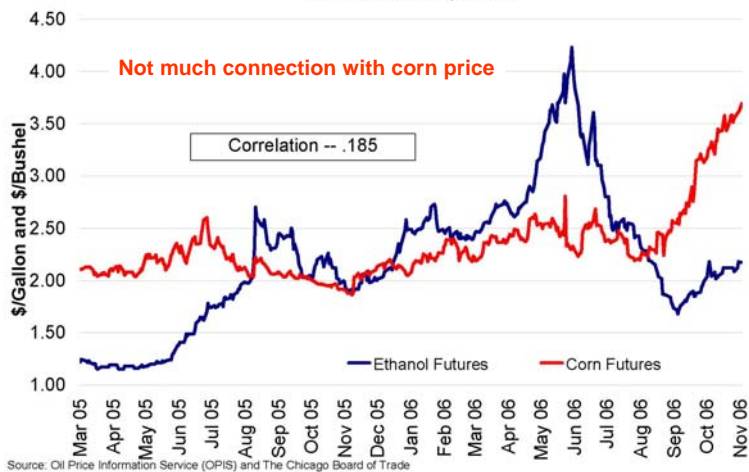
CBOT Ethanol Futures versus New York Cash Ethanol

Since Launch: March 23, 2005 - present



CBOT Ethanol Futures versus CBOT Corn Futures

March 23, 2005 - present



Ethanol consideration for grain producers (July 31, 2006)

you are logged in as tkasten Logout What's New DTN Audio Equities Forums

dtm AgDayta Help FAQ Contact Us

Home My AgDayta Futures & Options Crops Livestock Market Comments Market News Newsires Weather

Futures & Options > My Futures & Options Monday, July 31, 2006 7:51:37 AM CDT

try our advanced search

My Futures & Options Information
 Composite Futures
 Composite Options
 Custom Quotes
 Grains
 eCBOT Grains
 Winnipeg Grains
 Livestock
 Dairy
 Financial
 Indexes
 Currencies
 Other Commodities
 Energy
 Metals
 Tools
 Portfolio Manager
 Graphical Charts
 Java Charts

CBT Corn - D Futures Click on the chart icon to view the graphical chart print version

Contract	Open	High	Low	Last	Change	Bid	Ask	Vol	Op Int	Time
SEP 06	0	2392	2364	2372*	-4			26498	403640	13:43
DEC 06	0	2560	2530	2534*	-6			46402	546433	13:43
MAR 07	0	2696	2670	2672*	-10			4029	118973	13:43
MAY 07	0	2790	2766	2770*	-6			570	24978	13:43
JUL 07	0	2880	2850	2856*	-6				961	13:43
SEP 07	0	2934	2910	2930*	-10				750	13:43
DEC 07	0	3024	3000	3004*	-14				518	13:43
MAR 08	0	3120	3114	3114*	-10				853	13:43
MAY 08	0	3194	3174	3174*	-24			5	2947	13:43
JUL 08	0	3260	3240	3242*	-16			1145	8856	13:43
SEP 08	0	0	0	3204*	-14			0	544	13:44
DEC 08	0	0	0	3236*	-20			1315	55004	13:43
DEC 09	0	3390	3376	3380*	-16			187	463	13:43

Click on the chart icon to view the graphical chart

Ethanol demand premium?

70

Ethanol consideration for grain producers (Jan. 2007)

you are logged in as tkasten Logout What's New DTN Audio Equities Forums

dtm AgDayta Help FAQ Contact Us

Home My AgDayta Futures & Options Crops Livestock Market Comments Market News Newsires Weather

Futures & Options > My Futures & Options Tuesday, January 2, 2007 6:16:46 PM CST

try our advanced search

My Futures & Options Information
 Composite Futures
 Composite Options
 Custom Quotes
 Grains
 eCBOT Grains
 Winnipeg Grains
 Livestock
 Dairy
 Financial
 Indexes
 Currencies
 Other Commodities
 Energy
 Metals
 Tools
 Portfolio Manager
 Graphical Charts
 Java Charts

CBT Corn - D Futures Click on the chart icon to view the graphical chart print version

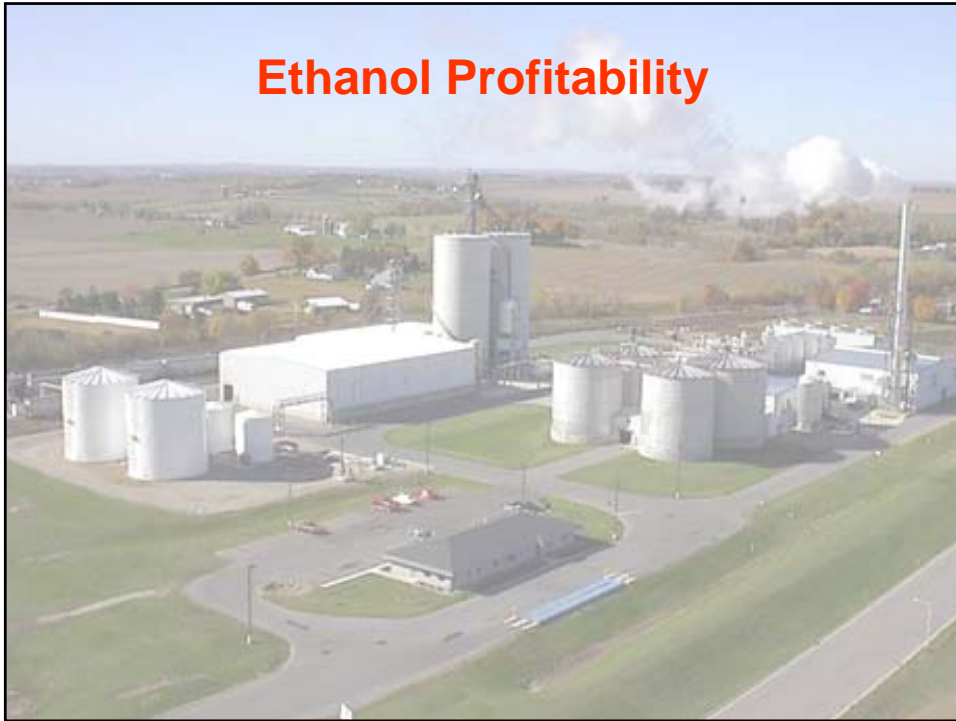
Contract	Open	High	Low	Last	Change	Bid	Ask	Vol	Op Int	Time
MAR 07	0	0	0	3902*	0			29338	597441	18:42
MAY 07	0	0	0	3984*	0			5527	118554	12:33
JUL 07	0	0	0	4024*	0			11	812	12:33
SEP 07	0	0	0	3864*	0				360	12:33
DEC 07	0	0	0	3746*	0				749	18:42
MAR 08	0	0	0	3796*	0				225	18:42
MAY 08	0	0	0	3870*	0			31	5259	12:33
JUL 08	0	0	0	3930*	0			562	20094	12:33
SEP 08	0	0	0	3630*	0			15	4305	18:42
DEC 08	0	0	0	3604*	0			1354	74439	18:42
JUL 09	0	0	0	3684*	0			14	210	12:33
DEC 09	0	0	0	3484*	0	0		196	5933	12:33

Click on the chart icon to view the graphical chart

Ethanol demand premium?

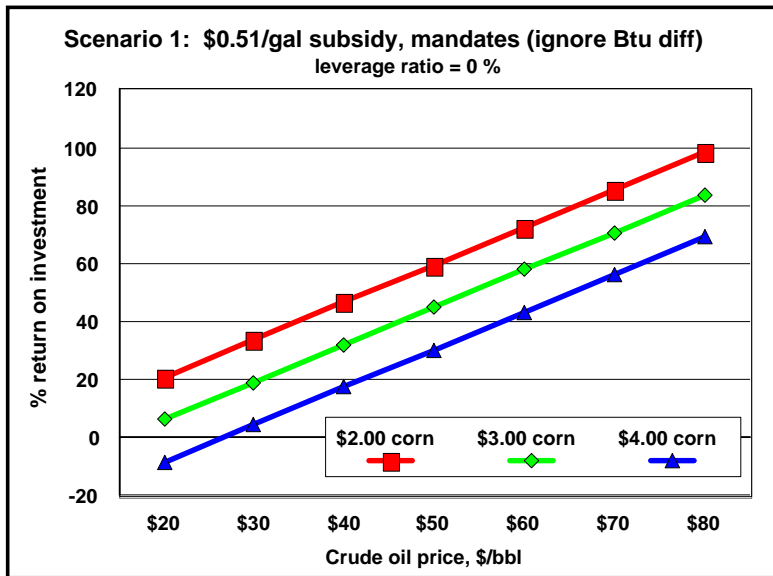
71

Ethanol Profitability



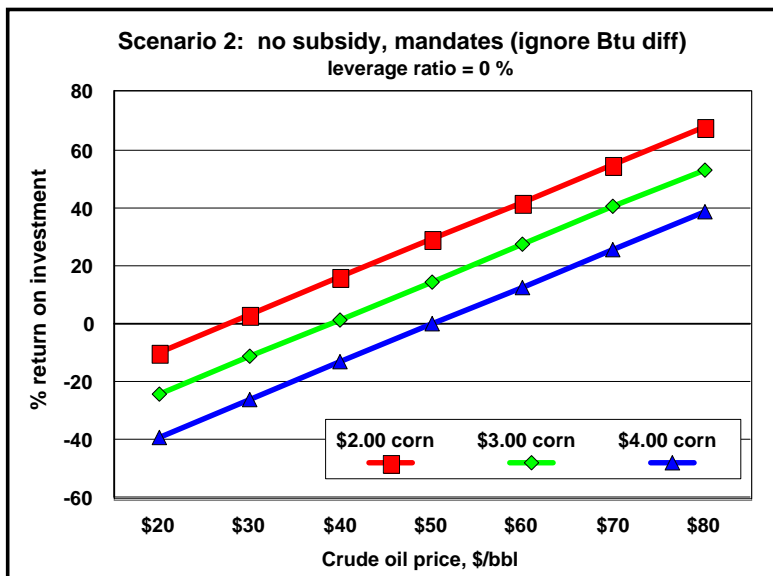
Ethanol Assumptions

- 2.75 gal ethanol/bu of corn
- 18 lb DDG/gal ethanol
- DDG valued at 1.0263 of corn price
- 0.038 MCF natural gas/gal of ethanol
- 0.05 gal gasoline added to a gal ethanol to make 1.05 gal
- Btu of ethanol (with denaturant) is 62.73% of gasoline
- 0.80 Kwh/gal ethanol at \$0.06/Kwh cost
- \$1.67/gal annual capacity is initial investment
- 6% loan interest rate
- \$0.51/gal subsidy (no state subsidies)
- \$0.2202/gal costs for non-corn, non-natural gas, and non-denaturant
- Natural gas and gasoline prices predicted with a statistical model using crude oil as determinant
- Ethanol price based on gasoline & subsidy & Btu adjustment



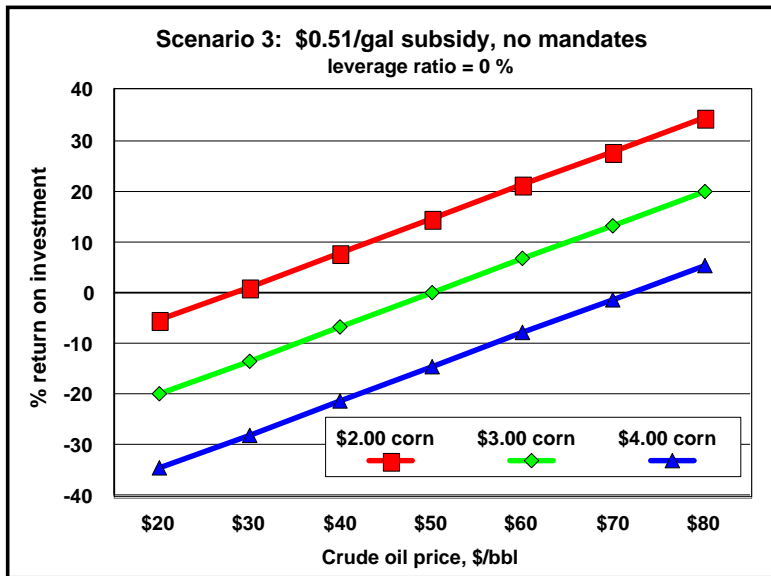
More or less today, ethanol premium due to mandates + subsidy

78



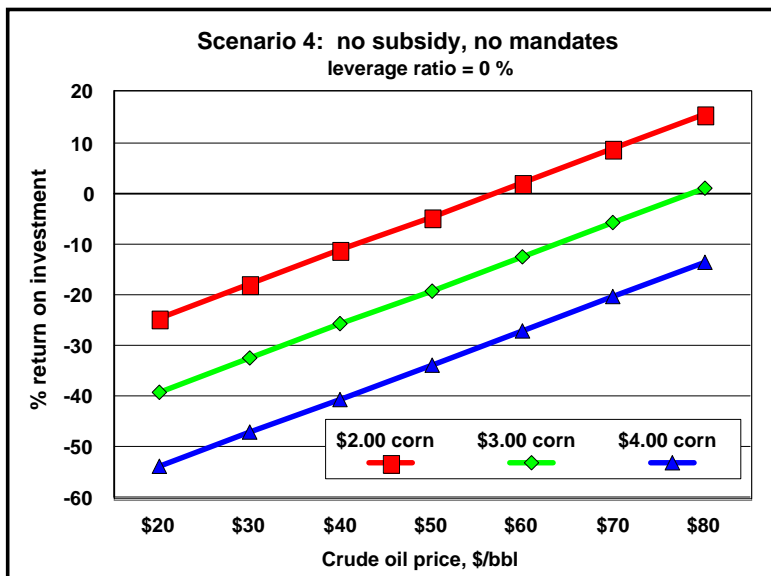
No subsidy but ethanol premium due to mandates continues

79



Subsidy continues, but no more ethanol premium due to mandates

80



No subsidy, no premiums (ethanol truly a gasoline substitute)

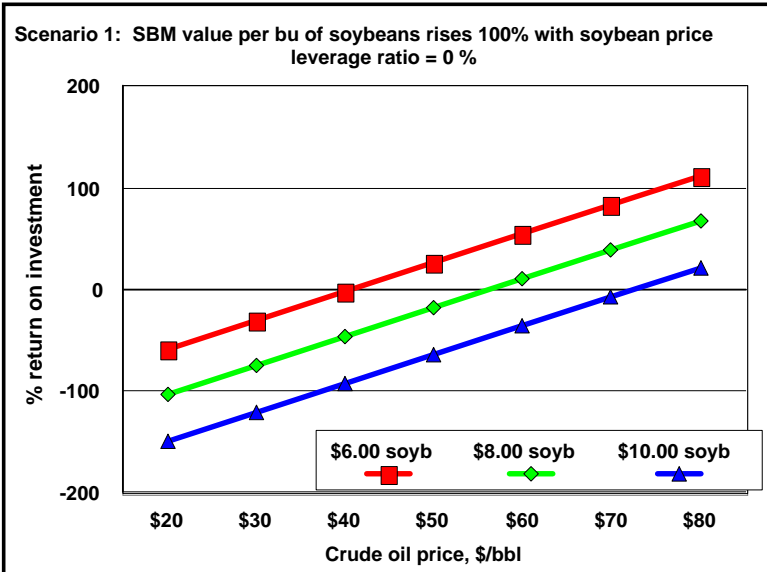
81

Pacific Ethanol stock price

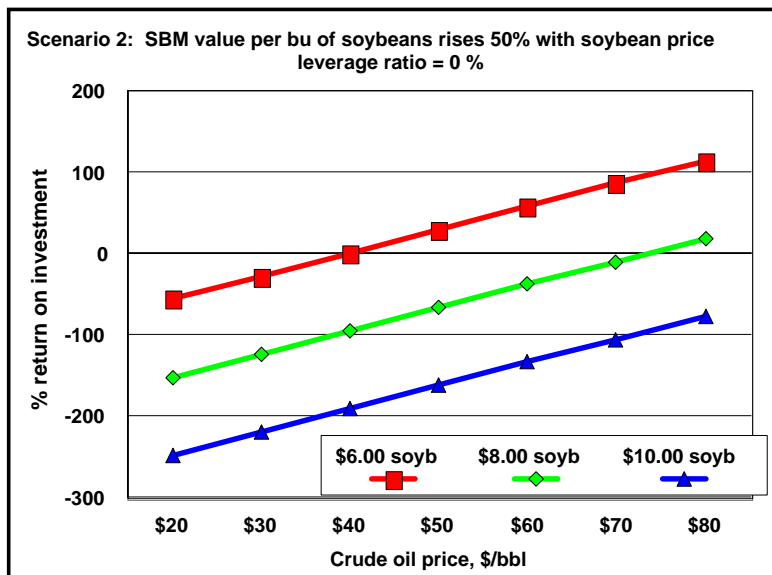


Pacific Ethanol stock price





95



96

